

What Is Claimed Is:

1. A conformable veil comprising:
a plurality of fibers having an average length of between approximately 0.5 and 2 meters; and
a polystyrene-based binder applied to said
5 plurality of fibers, said polystyrene-based binder being substantially soluble in a sheet molding compound resin paste.
2. The conformable veil of claim 1, wherein
said plurality of fibers have an average length of
10 between approximately 1 and 2 meters.
3. The conformable veil of claim 2, wherein
said polystyrene-based binder comprises approximately
10 percent of the total weight of said conformable
15 veil.
4. The conformable veil of claim 3, wherein
said plurality of fibers comprises a plurality of glass
fibers.
5. The conformable veil of claim 2, wherein
20 said polystyrene-based binder is formed from a
polystyrene-based emulsion in water.
6. The conformable veil of claim 5, wherein
said polystyrene-based emulsion comprises Vinamul 7700.
7. The conformable veil of claim 2, wherein
25 when said veil is compression molded, said binder is
substantially dissolved in a resin, and said veil
elongates wherein said plurality of fibers have an
average fiber diameter of between approximately 11 and
14 micrometers.

8. The conformable veil of claim 2, wherein said veil, when compression molded, elongates over 50% without any visible holes or tears.

9. The conformable veil of claim 8, wherein
5 said veil, when compression molded, elongates over 100% without any visible holes or tears.

10. The conformable veil of claim 9, wherein said veil, when compression molded, elongates over about 400% without any visible holes or tears.

10 11. A sheet molding composite sheet comprising:
a first layer of resin paste;
a second layer of resin paste; and
a conformable veil sandwiched between said
15 first layer and said second layer, said conformable veil comprising a plurality of fibers bound together with a polystyrene-based binder and having an average length of between approximately 0.5 and 2 meters.

12. The sheet molding composite sheet of
20 claim 11, wherein said veil comprises a plurality of fibers having an average length of between approximately 1 and 2 meters.

13. The sheet molding composite sheet of
25 claim 11, wherein said polystyrene-based binder comprises approximately 10 percent of the total weight of said conformable veil.

14. The sheet molding composite sheet of claim 11, wherein said polystyrene-based binder is substantially soluble in said first layer of resin paste and said second layer of resin paste.

5 15. The sheet molding composite sheet of claim 11, wherein said plurality of fibers comprises a plurality of glass fibers.

16. The sheet molding composite sheet of claim 11, wherein said polystyrene-based binder is
10 formed from a polystyrene-based emulsion in water.

17. The sheet molding composite sheet of claim 16, wherein said polystyrene-based emulsion comprises Vinamul 7700.

18. The sheet molding composite sheet of
15 claim 11, wherein said plurality of fibers have an average fiber diameter of between approximately 11 and 14 micrometers.

19. The sheet molding composite sheet of
20 claim 11, wherein said veil, when compression molded, elongates over 50% without any visible holes or tears.

20. The sheet molding composite sheet of 19, wherein said veil, when compression molded, elongates over 100% without any visible holes or tears.

25 21. A method for forming a relatively smooth sheet molding compound composite part having good binder and fiber distribution, the method comprising:
 forming a conformable veil, said conformable veil comprising a plurality of fibers having an average
30 length of between approximately 1 and 2 meters and a

polystyrene-based binder applied to said plurality of fibers;

forming one or more plies of a sheet molding compound compacted sheet, each of said plies comprising
5 a layer of said conformable veil placed between a first layer of a resin paste and a second layer of said resin paste;

introducing at least one of said one or more plies to a molding device, one of said one or more
10 plies of said sheet molding compound compacted sheet being located at a visible surface of said molding device to form the sheet molding composite part;

molding said at least one of said at least one plies within said molding device, wherein said
15 molding step causes said polystyrene-based binder of said conformable veil to substantially dissolved within said first layer and said second layer of said at least one plies.

22. The method of claim 21 further
20 comprising:

providing at least one ply of a laminated sheet, said laminated sheet comprising a plurality of chopped fiber reinforcements coupled within a third layer of a second resin paste and a fourth layer of
25 said second resin paste, said second resin paste being compatible with said resin paste; and

introducing at least one of said at least one ply of laminated sheet to said molding device, wherein each of said at least one of said at least one ply is
30 located at a position further away from said visible surface than said one or more plies of said sheet molding compound compacted sheet.

23. The method of claim 21, wherein forming a conformable veil comprises:

forming a plurality of glass fibers having a length of between about 1 and 2 meters and an average
5 diameter of about 11 to 14 micrometers;

forming a random mat of said plurality of glass fibers;

impregnating said mat with a polystyrene-based emulsion;

10 introducing said impregnated mat to an oven at a first temperature, said first temperature sufficient to melt bond said polystyrene-based emulsion to said plurality of glass fibers to form the conformable veil without melting said plurality of
15 glass fibers; and

removing said conformable veil from said oven.

24. The method of claim 23, wherein said first temperature is between approximately 100 and 150
20 degrees Celsius.

25. The method of claim 21, wherein forming one or more plies of a sheet molding compound compacted sheet comprises:

providing a lower carrier film;

25 introducing a first layer of paste onto said lower carrier film;

introducing said conformable veil onto said first layer of paste;

introducing a second layer of paste onto said
30 conformable veil;

introducing an upper carrier film onto said second layer of paste to form a sheet molding composite sheet;

compacting said sheet molding composite sheet; and

maturing said compacted sheet molding composite sheet.

5 26. The method of claim 22, wherein said second resin paste has the same composition as said resin paste.

27. The method of claim 23, wherein forming a plurality of glass fibers comprises:

10 forming a plurality of fibers an average diameter of about 11 to 14 micrometers; and

 chopping said plurality of fibers to an approximate length of between 0.5 and 2 meters.